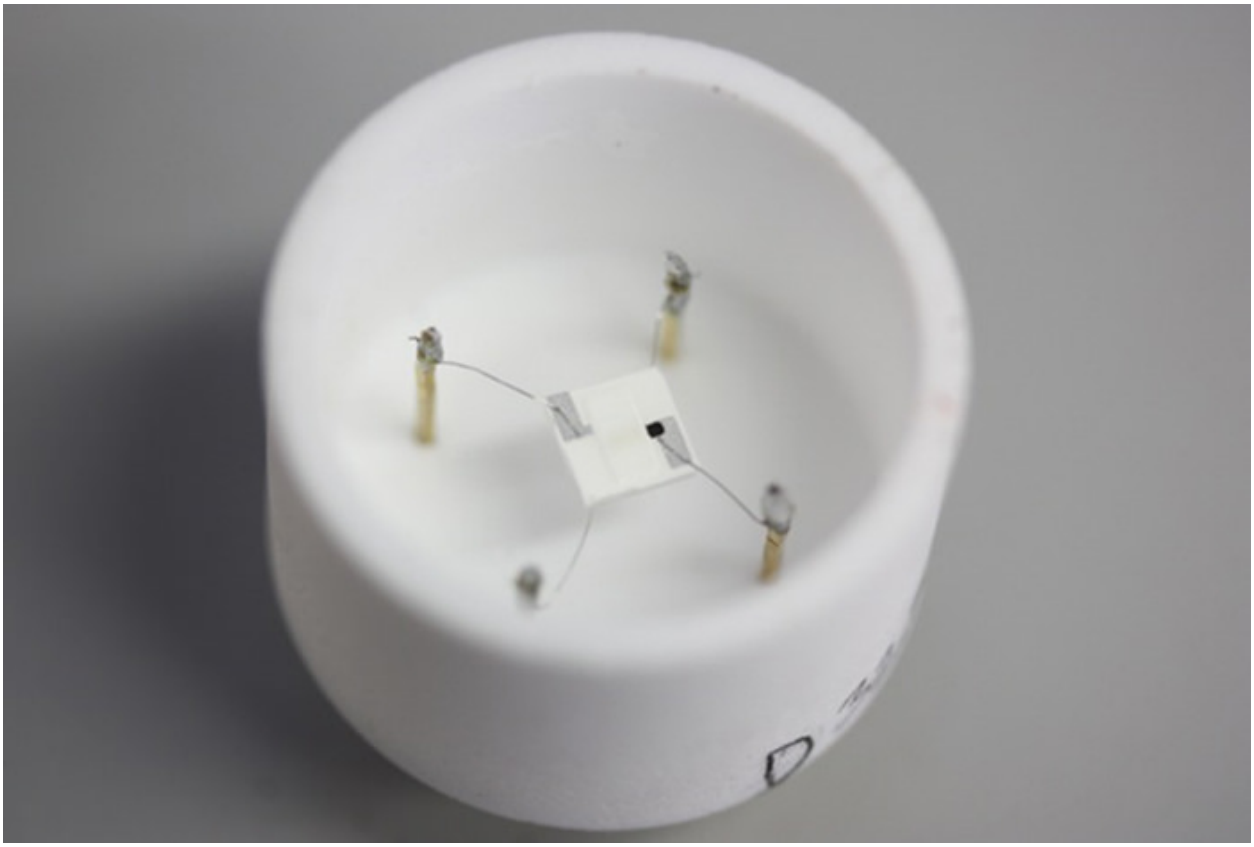
# Lab-developed hydrogen sensors tested at SoCal refueling stations

November 8, 2016



## Los Alamos National Laboratory partners with Lawrence Livermore National Laboratory for development and testing

As hydrogen becomes more viable as a power source and hydrogen distribution stations begin to proliferate, government agencies are turning to Los Alamos National Laboratory (LANL) and Lawrence Livermore National Lab (LLNL) to help detect leaks that could potentially lead to fire.

The California South Coast Air Quality Management District (SCAQMD), the smog control agency for four Southern California counties, is partnering with researchers from the two labs on a demonstration for prototypes of highly sensitive hydrogen sensors at two hydrogen-refueling stations in the Los Angeles area.

Teams led by chemist Eric Brosha at LANL and at LLNL by now retired chemist Bob Glass developed the sensors in work over the last decade. The sensors can detect the amount of the colorless, odorless gas in the atmosphere at the critical range for safety applications, without triggering false alarms, and with very rapid response time. The SCAQMD project has been led since 2014 by LLNL engineer Amanda Wu, in field demonstration trials to support eventual commercialization.

"Hydrogen is notoriously difficult to contain and prone to leakage. The point of field trials is to demonstrate the ability of our sensors to detect hydrogen consistently and reliably," said Wu.

Researchers want to incorporate the sensors into the refueling stations as a safety device that would trigger an emergency shutoff or prompt an alert to take action when detection levels reach 2 percent. Eventually, Glass said, the sensors also will be adapted for installation within the passenger compartment and in critical areas near the fuel supply line in vehicles to detect hydrogen leaks.

Current commercial sensors, the researchers said, need frequent recalibration and can generate false alarms, which lead to shutdowns and unnecessary response from fire departments. The advantage of the new sensors, Glass said, is that they can be made at low cost, with higher durability and reliability.

So far, according to LANL's Brosha, the sensors have shown they are sensitive enough to detect even minute levels of hydrogen released during normal refueling operations while screening out airborne pollutants, hydrocarbons and combustion byproducts, and smog and smog forming agents present in the atmosphere.

"We've been collecting data continuously and we've proven everything we've claimed our sensors could do with regards to baseline stability," Brosha said. "We've never had a single false alarm. We're able to detect the day-to-day activity and we've never seen a peak that wasn't the result of a fill activity demonstrating that they are performing very well."

Glass noted: "This technology is more stable and is designed to show less drift over time. Ultimately, we want to use these on a hydrogen fuel cell car, with even more demanding performance requirements."

SCAQMD and the two national labs are funding the trials, which end in January 2017. Following the test run, Brosha said the sensors would be brought back to LANL to test their durability and performance when operated in the field.

*Caption for image below: The sensor unit has been installed in a hydrogen filling facility for field testing. To date, the systems have performed as designed.*